#### **Draft Report**

## Metals TMDL for Little Kanawha River Watershed, West Virginia

# US Environmental Protection Agency Region 3 4650 Arch Street Philadelphia, PA

**July 2000** 

#### Acknowledgments

The completion of this study depended upon the generous informational and data support from various groups. Special acknowledgment is made to the following people:

Beth Adams United States Fish and Wildlife Service

Greg Adolfson West Virginia Division of Environmental Protection-

Office of Abandoned Mine Lands and Reclamation

Tom Brand West Virginia Department of Agriculture Teresa Byler West Virginia Soil Conservation Agency

Pat Campbell West Virginia Division of Environmental Protection-Office of Water Resources

Sara Clapham Westvaco Corporation

Angela Dorsi West Virginia Office of Mining and Reclamation

Paul Dunn Natural Resources Conservation Service

David Flannery Jackson and Kelly

Jay Hannah United States Department of Agriculture-Natural Resources Conservation Agency

Steve Hannah West Virginia Farm Bureau

Ray Joseph West Virginia Oil and Natural Gas

James Laine West Virginia Division of Environmental Protection-Office of Water Resources

Mike Lewis Division of Environmental Protection-Office of Oil and Gas

Dave Miller West Virginia Department of Agriculture
Scott Morison West Virginia Division of Natural Resources
Lacy Parsons West Virginia Soil Conservation Agency

Kim Poland Robinson and McElwee LLP

Tim Prescott United States Department of Agriculture-Natural Resources Conservation Agency

Bob Radabaugh Independent Oil and Gas Association
Charles Riling West Virginia Department of Highways

Gene Smith West Virginia Division of Environmental Protection-Office of Oil and Gas

Jerry Tephabock West Virginia Division of Environmental Protection-Office of Oil and Gas

Steve Stutler West Virginia Division of Environmental Protection-Office of Water Resources

Jim Warren West Virginia Division of Forestry
Dick Waybright West Virginia Forestry Association

Andy Weaks West Virginia Division of Environmental Protection-Office of Water Resources

July 2000 - Draft i

#### **Table of Contents**

Acknowledgments	
Table of Contents	ii
List of Figures	<b>v</b>
List of Tables	V
TMDL Fact Sheets	vii
1. Problem Understanding	1-1
2. Applicable Water Quality Standards	2-1
3. Impairment Analysis	3-1
3.1 Data and Information Inventory	3-1
3.1.1 Stream Flow Data	
3.1.2 Instream Water Quality Data	3-3
3.2 Listing Confirmation	3-6
3.3 Water Quality Conditions Analysis	3-6
3.3.1 Critical Flows	
3.3.2 Analysis of Water Quality Impairment for Aluminum and Iron	3-7
4 Source Assessment	
4.1 Nonpoint Source Identification	
4.2 Point Source Identification	
5. Summary of Technical Approach	
5.1 Introduction	
5.2 Modeling Approach	
5.2.1 Overall System Characterization	
5.3 Modeling Options	
5.3.1 Rainfall and Evaporation	
5.3.2 Hydrologic Simulation	
5.3.2.1 Subwatersheds Delineation and Characterization	
5.3.2.2 Land Use/Land Cover Classification	
5.3.2.3 Subcatchment Perviousness/Imperviousness	
5.4 Water Quality Modeling	
5.5 Erosion and Sedimentation	
5.5.1 Erosion and Sediment Source Representation in the Model	
5.6 Base Flow and Background Concentrations Conditions	
5.6.1 Base Flow conditions	
5.6.2 Background Concentration Conditions	
5.7 Routing	
6. TMDLs	
6.1 Geographic Extent of the TMDL	
6.2 Evaluation of Monitoring Data for Selection of TMDL Allocation	
6.2.1 Selection of Critical Time Period	
6.2.2 Frequency and Magnitude of Water Quality Impairment	
6.3 Model Testing	
6.4 Existing Condition	
6.5 Allocation Scenarios	
6.5.1 Objective of the Allocation	

ii Draft - July 2000

### Metals TMDLs for Little Kanawha River Watershed

6.5.2 Stage 1 Interim Loading Targets	6-18
6.5.3 Stage 2 Interim Targets	6-23
6.5.4 Stage 3 Final Loading Targets: TMDL	6-23
7. Monitoring Plan	. 7-1
8. Point and Nonpoint Source Control Approaches	. 8-1
9. Public Participation	
10. Administrative Record	10-1
References	. R-1
Appendix A. Little Kanawha TMDL: Water Quality Data Analysis	<b>A-</b> 1
Appendix B. Little Kanawha Watershed TMDL: Data and Information Supporting the	
Technical Approach Development	. B-1
Appendix C. Little Kanawha Watershed TMDL: Summary of Allocation Results	. C-1

July 2000 - Draft iii

### **List of Figures**

Figure 1.1 Little Kanawna River Watersned	I-2
Figure 1.2 303(d) listed waters within the Little Kanawha River Watershed	1-3
Figure 3.1 USGS flow gaging stations in the Little Kanawha Watershed	3-4
Figure 3.2 Water quality monitoring stations in the Little Kanawha Watershed	3-5
Figure 5.1 Major tributaries of the Little Kanawha River	5-1
Figure 5.2 Little Kanawha River rainfall stations	5-2
Figure 5.3 Land use/land cover distribution in the Little Kanawha River Watershed .	5-6
Figure 5.4 Reclassified Little Kanawha River watershed Land Segment Distribution	5-6
Figure 5.5 Gage station locations for the Little Kanawha River Watershed	. 5-15
Figure 6.1 Little Kanawha Watershed Segmentation (for Allocation)	6-3
Figure 6.2 Little Kanawha Watershed Segmentation (for Loading Evaluation)	6-4
Figure 6.3 Aluminum concentrations in Saltlick Creek in Burnsville	6-6
Figure 6.4 Iron concentrations in Saltlick Creek in Burnsville	6-7
Figure 6.5 Time series of simulated and observed daily streamflows for the Little Kan	awha
at N60	6-8
Figure 6.6 Average monthly rainfall and simulated and observed flows for the Little	
Kanawha at N60	6-9
Figure 6.7 Observed versus predicted flow for the Little Kanawha River watershed	6-9
Figure 6.8 Observed and modeled conditions at Spring Creek	. 6-11
Figure 6.9 Observed and modeled conditions at Reedy Creek	. 6-12
Figure 6.10 Observed and modeled conditions at Saltlick Creek	. 6-13
Figure 6.11 Observed and modeled conditions at Sand Fork	. 6-14
Figure 6.12 Observed and modeled conditions at Oil Creek	. 6-15
Figure 6.13 Spring Creek existing conditions and stage 1 allocation	. 6-16

iv Draft - July 2000

#### **List of Tables**

Table 2-1 West Virginia water quality standards for All Uses 2-1
Table 3-1 Inventory of data and information used in the development of the Little Kanawha
River TMDL
Table 3-2 USGS flow gages located in the Little Kanawha River Watershed 3-3
Table 3-3 Water quality stations located in the Little Kanawha River
Table 3-4 Instream water quality for the Little Kanawha River Watershed 3-6
Table 4-1 Conceptual representation of potential sediment sources and their Impacts 4-3
Table 4-2 Number of point source discharges in the Little Kanawha River Watershed 4-4
Table 5-1 WV GAP 2000 Land Use/Land Cover
Table 5-2 Representative land use classes applied in SWMM simulations 5-7
Table 5-3 Land use effective percent impervious values used in the SWMM model 5-9
Table 5-4 Conceptual representation of potential sediment sources and their Impacts 5-11
Table 5-5 Summary of erosion and sedimentation parameters used in SWMM 5-16
Table 6-1 Listed segments and associated subwatersheds for TMDL development 6-5
Table 6-2. Water Quality Monitoring Exceedence Summary (1993-1994 monitoring data)
6-8
Table 6-3 Comparison of simulated and observed flows in the Little Kanawha River at N60
(June - November 1990)
Table 6-4 Number of exceedences predicted under existing conditions for impaired reaches
6-17
Table 6-5 Predicted average annual loading for 1993-1994 hydrologic condition for Little
Kanawha major subwatersheds
Table 6-6 Stage 1 Allocation - Scenario 1
Table 6-7 Stage 1 Allocation - Scenario 2
Table 6-8 Stage 1 Allocation - Scenario 3
Table 6-9 Interim point source loading targets for iron (Stage 1 assuming Scenario 2) . 6-22
Table 6-10 Stage 3 Final Load Reduction Targets for the Little Kanawha Metals TMDLs
(assumes implementation of scenario 2)
Table 6-11 Interim point source loading targets for iron for Stage 3 6-24

July 2000 - Draft